

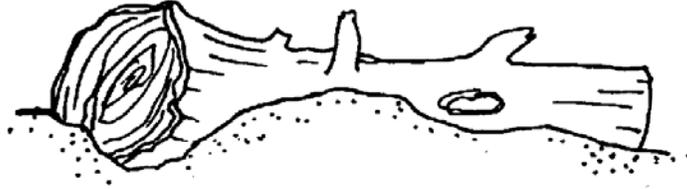


**Education,  
Research,  
Stewardship**

WASHINGTON STATE UNIVERSITY  
ISLAND COUNTY EXTENSION

# Beach Log

OCTOBER 2006



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## What are these Beach Watchers doing?



These Beach Watchers are using an ancient fishing technique called seining. To learn what seining is, why Beach Watchers do it, where they do it, when they do it, and what they have learned from it take a look at the new Seining Project web pages on Beach Watchers web site: <http://www.beachwatchers.wsu.edu/whidbey/seining>

*Jean Summers, BW class of '04*

## BW 2006 Class Schedule

All Beach Waters are welcome to these classes. Refreshing your knowledge and meeting the new class is encouraged.

### 17 October, Tuesday @ Cpv1 Rec Hall

9:AM – 10:30AM Mushrooms and Fungi - Scott Chase  
10:30AM – Noon Shore Stewards and Shoreline Living  
Noon – 1 PM Special bivalve lunch!  
1 PM – 4 PM Geoduck Aquaculture - Teri King from Sea Grant

### 19 October, Thursday @ Cpv1 Rec Hall

9 AM – 12:30 PM Jeff Tate, Director of Planning and Community Development & Matt Kukuk from the Is. Co. Planning Dept. on Shoreline Management, Growth Management and critical areas  
Linda Lyshall from Puget Sound Action Team on Low Impact Development

### 24 October, Tuesday @ Maxwelton Outdoor Classroom

9:30 AM – 12:30 PM – Matt Nash from Is. Co. – Wetlands  
1:30 PM – 3:30 PM – Maxwelton Outdoor Classroom & Whidbey Watershed Stewards – Restoration & Watersheds 26

### 26 October, Thursday @ Coupeville Rec Hall

9 AM – NOON - Terri Dix – Wrap up on interpretation & education, prep for mini presentation.  
1 PM – 2:30 PM – Cheryl May – Plastic litter on the beaches

### 31 October, Tuesday @ Coupeville Rec Hall

## Graduation time!!!!

12:30 PM Potluck  
2:00 PM Graduation

Come join the Class of 2006 and share your Beach Watcher adventures, stories, and knowledge.



## Monitoring Madness

### Red Tides, Brown Tides, and HABs

Working in the lighthouse office on Friday, September 22, Janet Hall fielded a lot of phone calls from folks alarmed that large patches of water along the east side of Whidbey Island had turned red-orange. Was it a spill? Pollution? Some sort of warning from the Department of Homeland Security? As it turns out, it was none of these but instead, an algal bloom by a dinoflagellate from the genus *Noctiluca*. Algal blooms like these are often termed “red tides,” and that name suits blooms by the nontoxic *Noctiluca*. But other organisms may experience similar blooms that endanger humans and wildlife with no apparent change in water appearance. These are called harmful algal blooms, or HABs. Island County and nearby waters have recently experienced blooms by a number of different organisms causing public advisories and closure of shellfish beds.

As dinoflagellates go, *Noctiluca* is relatively large, the single-celled organism being just large enough to be visible to the naked eye. Viewed under a microscope, they appear balloon-like. Individuals have one flagellum which is used in feeding and elimination. The organism can control its buoyancy but otherwise depends upon winds and currents to determine its movements. A heterotroph, *Noctiluca* feeds on diatoms and other planktonic materials. Because it does not photosynthesize, *Noctiluca* does not contain pigments, but derives its color from the food it ingests. In certain parts of the world, this organism colors the water bright lime green instead of red. Additionally, some *Noctiluca* blooms are bioluminescent, and from this property it gets its name, as “*Noctiluca*” means “night light.”

As with other blooms, this organism is always present in the waters, although usually in low levels. When factors such as light, nutrients, temperature, etc. fall into place to create ideal circumstances, it begins to proliferate at an exponential rate and the bloom occurs. Wind blowing it up against a shoreline can concentrate it, resulting in spectacular coloration sometimes described having the appearance of tomato soup. As noted earlier, *Noctiluca* does not produce a toxin but has been known to cause oxygen depletion as it decomposes.

Signs warning of beach closures due to **paralytic shellfish poisoning (PSP)** have been posted in Island County this summer. Also caused by a dinoflagellate, PSP is a dangerous illness that may lead to death. In fact, one of Van-

couver’s crewmen died from PSP in 1793 as they made their way up the coast of British Columbia. The organism responsible for PSP is *Alexandrium catenella* which produces the potentially lethal saxitoxins. As shellfish filter the virulent dinoflagellate from the water, the toxin accumulates in their tissues. Humans or other organisms then eat the tainted shellfish, ingesting the accumulated toxins and, if they are present in high enough levels, bringing on the symptoms of PSP. It may take only one small mussel to contain a lethal dose of the saxitoxin.

In the same way that most snake venoms are not made up of just one compound, there are 21 different molecular combinations that make up saxitoxins. Some are more toxic than others and interestingly, the different saxitoxins can be transformed from one to another, a process that may take place within the *Alexandrium* organism, in shellfish that have ingested the dinoflagellate, and even within the human stomach where the transformation may be triggered by contact with gastric acid.



Noctiluca bloom on east Whidbey, September 22, 2006.



Symptoms of paralytic shellfish poisoning may appear rapidly after consuming tainted shellfish and include neurological signs such as tingling of the tongue, lips, and extremities and also breathing problems. These symptoms occur because the saxitoxins interfere with transmission of nerve impulses within the human body. There is no antidote for saxitoxin and it is not destroyed by cooking. A bloom of *Alexandria catenella* may cause the water to turn reddish but often there is no change in the appearance of the water during a bloom.

A biotoxin now getting considerable attention on the West Coast was found in harmful levels in mussels near Port Townsend in 2003. It was produced by diatoms from the genus *Pseudo-nitzschia*, causative agent of amnesic shellfish poisoning. The first time high levels of this organism were recognized on the West Coast was 1991, when it was found in birds near Monterey Bay, Calif. and in Dungeness crabs and razor clams on the Washington coast. Recognition of the spike near Port Townsend marked the first time it had been detected in significant levels in Washington's inland waters. The biotoxin associated with *Pseudo-nitzschia* is domoic acid. Symptoms of amnesic shellfish poisoning include gastrointestinal upset, dizziness, confusion, weakness, permanent loss of short term memory, and seizures. The deaths of both humans and more than 400 sea lions have been linked to this potent biotoxin. Like the biotoxins associated with paralytic shellfish poisoning, domoic acid is not destroyed by cooking.

A plankton drag off the Coupeville wharf in July brought up a sample the color of weak coffee. This "brown tide" probably resulted from high levels of the golden brown algae *Heterosigma* in the water, as a bloom of this organism was being noted in other Puget Sound area waters at that time. Blooms of this *Heterosigma* have been documented in local waters over the past 40 years with the last major bloom in 1997. This species is not toxic to humans but does kill fish by damaging their gills, and it has been a serious problem for fish farms.

Another toxin-producing organism that primarily impacted consumption of oysters this past summer was not algae but a bacterium. Seventy people became ill in the Hood Canal and South Puget Sound areas after eating oysters, leading health officials to order closure of shellfish beds. The culprit responsible for these illnesses, *Vibrio parahaemolyticus*, is related to the organism that causes cholera. It tends to cause problems during periods of warm weather when consumption of raw or undercooked seafood can be especially risky. This organism

causes gastrointestinal symptoms that usually begin within 12-24 hours after eating infected shellfish, and are reminiscent of "stomach flu."

The point of all this is of course to reinforce the importance of checking with the **biotoxin hotline (1-800-562-5632)** before harvesting shellfish. The Washington State Department of Health monitors for the toxins causing PSP and amnesic shellfish poisoning all year. In addition, they check levels of *Vibrio* during the warm summer months. For those who enjoy harvesting shellfish, the state department of health shellfish biotoxin program website, [www.doh.wa.gov/ehp/sf/BiotoxinProgram.htm](http://www.doh.wa.gov/ehp/sf/BiotoxinProgram.htm) contains a wealth of further information on how to do this safely. Have fun but keep yourself safe!

Mary Jo Adams, BW Class of 1999

## The Alfred Hitchcock—HAB Connection

I'll bet most of you remember Alfred Hitchcock's 1963 movie, "The Birds." It was a scary movie that centered on a small town besieged by large flocks of deranged birds. What you may not know is that this movie was based in part on an actual event that took place in Capitola (Monterey Bay), California in 1961. A large flock of sea-birds, mostly sooty shearwaters, began hurling themselves at store windows, assailing people, and generally storming the town. The incident apparently captured the imagination of Hitchcock, who had vacationed near the town where the bird attacks took place and subsequently based the movie on it.

Scientists now believe that the then-incomprehensible bird behavior came about after the birds ate anchovies containing high levels of domoic acid, the biotoxin that causes amnesic shellfish poisoning in people. The neurological effects of this toxin were not recognized until 1987 when a large number of people sickened and several died from it in eastern Canada. It wasn't until 1991 that scientists became aware of its presence in significant levels on the west coast of North America. The neurotoxin is now known to affect birds and marine mammals and to cause bizarre behavior, illness, and death in these animals.

If you're looking for a spooky movie to watch for Halloween, "The Birds" would be a good choice. Happy Halloween!

Mary Jo Adams, BW Class of 1999





## Dates to Remember Upcoming Camano Island and Whidbey Island Events and Other Items of Interest



### \*CAMANO ISLAND

**Monday, November 6, 2006.** *Camano Island Monthly Meeting.* Camano Center.

**Friday, December 8, 2006.** *Camano Island Beach Watchers Holiday Party.* Camano Country Club. Mark your calendars, details to follow.

### WHIDBEY ISLAND

**October 19, Thursday 2006.** *Whidbey Beach Watcher Monthly Meeting.* Race Road Fire Station, 6:00 pm. Frances Wood will speak on Pigeon Guillemot Bird Breeding Program. All welcome

**October 30, Monday 2006.** *Whidbey 101.* Find out about all the environmental programs in your community. 6:30 – 8:30PM at Trinity Lutheran Church in Freeland. Call (360) 678-7974 for more details.

**October 31, Tuesday 2006.** *Whidbey 2006 Beach Watcher Class Graduation.* Coupeville Rec Hall 12:30PM Potluck Lunch, 2PM Graduation Ceremony.

**November 16, Thursday 2006.** *Whidbey Beach Watcher Monthly Meeting.* Trinity Lutheran Church, 6:00 volunteer meeting, 7PM presentation by Washington Water Trails Association.

**November 18, Saturday 2006.** *Seafood & Marine Toxins.* Whidbey General Hospital free Community Education Class 10AM – Noon, conference room A. Registration required, call (360) 678-7656 ext. 4005 for more information.

**December 21, Thursday 2006.** *Whidbey Beach Watcher Holiday Party.* Come celebrate the Holiday's with your fellow Beach Watchers and friends with food, drink, and fun auction items

## Sad News

I'm very sorry to inform you that Joey Eldridge (BW class of 2002) died on October 10. She was a remarkable person. Only last week I learned that Joey was really Betty Joan (pronounced Jo-ann) but that at some point in junior high or high school she decided that her school had a surplus of Bettys and so she became *Joey, just Joey*. Doesn't that sound just like our friend? A determined, independent person even as kid.

As a Beach Watcher she helped with almost everything. I think she had a hand in nearly every project that came down the pike since she became a BW in 2002. The photo below was from a 2005 bio-survey at Cama Beach.

She definitely will be missed by folks locally and even globally. Joey still got phone calls and visits from former foreign exchange students in various parts of the world who spent time living with Joey and her family decades ago while they were students at UW. Pretty amazing.

Joey's memorial service is scheduled for Sunday, Oct. 22 at 3:00 p.m. at the Stanwood United Methodist Church. The church is located at 27128 102nd Drive NW in the west side of Stanwood. A reception at the church will follow immediately after the memorial service.

If you would like to bring homemade cookies to Joey's *last potluck*, please let me know. Cookies or no I'm hoping that you'll be able to join Joey's family and friends at the service.

In recognition of Joey's strong commitment to the Camano BW organization the family has decided to request that anyone wishing to make a monetary contribution in memory of Joey do so by sending a check to the Camano Beach Watchers! I think Joey would be quite pleased with that wonderful decision.



*John Custer, BW Class of 2002*



## Green Expo Review

It takes something special to entice me to spend a day in Seattle. I am a very reluctant traveler when it comes to heading off the island and into the city, but I gritted my teeth and caught an early ferry Saturday, October 23 to attend the "Seattle Green Living Expo at High Point." The expo was designed for two purposes; first, to sell homes in a new development, and second to show off Seattle Public Utility's (SPU) "Green" projects. David agreed to go, if I would meet him in Anacortes the next day for the famed Oyster Run. I don't "do" motorcycles any more but it seemed only fair that we accompany each other to two very different events.

The event ran for two weekends and was free. Knowing that the developers put on the Expo to sell homes, I wasn't prepared for the excellent quality of the displays, information booths, and experts on hand to educate visitors about "Green" choices. There was a full schedule of activities to choose from including a docent guided tour along permeable sidewalks bordered by swales, next to streets with permeable paving, all leading to a huge pond in a commons area. There were exhibits, seminars, and hands-on learning experiences set up to feature a sustainable neighborhood.

SPU presented a walking tour, "Natural Yard Care--Easy, Healthful and Beautiful," focused on drought-tolerant, pest-resistant plants. The guide discussed organic fertilizers and lawn care products that are water-friendly.

The tour I enjoyed most was "Everything's 'Swale' in the Neighborhood." SPU has done an amazing job of planting the area between sidewalks and streets with water retaining shrubs, grasses and groundcovers to naturally filter toxins from run-off water before it reaches Longfellow Creek. They helped to integrate an extensive natural drainage system throughout the new community. This is not their first effort. SPU has used similar drainage systems throughout Seattle to improve the health of urban creeks and surrounding waters.

Most of the plants used are listed in a resource book titled *The Plant List, A Better Way to be Beautiful*, a companion to *Choosing the Right Plants, Natural Lawn and Garden Guide*. This excellent resource describes wet winter/dry summer plants, moisture-loving plants, Pacific NW native plants, and drought-tolerant plants. To request this free, excellent guide, contact the Natural Lawn and Garden hotline at 206-633-0224 or [info@lawnandgardenhotline.org](mailto:info@lawnandgardenhotline.org) or visit [www.savingwater.org](http://www.savingwater.org).

We don't have to drive to Seattle to see innovative approaches to control surface water run-off. There are many examples in Bayview, but it was exciting to see these ideas implemented in an urban environment on a large scale. The plantings were beautiful, filled with an assortment of grasses, reeds, and shrubs offering a perfect transition from street to sidewalk. Lush and green, it added another dimension to an area that is normally flat and boring. Gone are the planting strips so common in most of Seattle's neighborhoods. You know the kind I'm talking about -- flowering plum trees and a layer of bark. The swales in the High Point development are deep and filled with amended soils. Designed to manage the flow of water, they are filled with plants whose roots capture and filter the water before



*Photo by Roxallanne Medley*

it enters streams or the Sound.

On the drive home, David and I discussed "Green" practices on Whidbey and why there aren't swales and permeable sidewalks in our island towns. Someone on our tour asked the docent this same question. The docent's answer was that it is expensive because not enough people are actively pursuing "Green" alternatives for paving, landscaping, and water control. Like all good things, the more they are used, the less expensive they become.

As island residents learn more about "Green" alternatives, we can request our local government to encourage (even require) developers and homebuilders to implement these effective practices. If it can be done in a huge city like Seattle, our island towns can discourage builders from paving parking lots with asphalt, homeowners from pouring concrete driveways and patios, and landscapers from planting sidewalk strips with flowers and plants requiring lots of water, all running downhill, carrying pollutants from street run-off into our streams, coves, and Puget Sound.

*Roxallanne Medley, BW Class of 2003*



# Have you seen this oceanographic mooring?

The Olympic Coast National Marine Sanctuary has lost their oceanographic mooring that was stationed off Cape Elizabeth (47° 21'19; 124° 28'06). It was recording critical oceanographic data that they hate to lose. Last seen on Sept. 25, it could wash ashore, or have moved off station.



The lost reflector pole and float look like this, except the round float is orange colored.

The mooring had a high-flyer pole with a reflector on top and an orange (crab) surface float (these may be missing). The oceanographic equipment on the mooring line consisted of two cylindrical devices with "SBE" and "Seabird" written on them. A phone number for Seabird is



on the instrument label, as well as a serial number. One of the instruments is about 3 feet long by 4 inches in diameter, of a white plastic material with two smaller cylinders attached to it with hose clamps. The other cylinder is shorter and a silver metal. There may also be an orange tag on these instruments that says "OCNMS" with the Olympic Coast National Marine Sanctuary phone number. The water current meters look like they are in a metal frame.

If you find any pieces of this, please contact Mary Sue Brancato or Ed Bowlby at 360-457-6622, ext. 20 and 17, respectively, or e-mail at [mary.sue.brancato@noaa.gov](mailto:mary.sue.brancato@noaa.gov) or [ed.bowlby@noaa.gov](mailto:ed.bowlby@noaa.gov). They thank you!

*David Freed, WSU BW of Clallam Countyá*



Dave Kirner is working with the current meters, in foreground, and attaching six small yellow thermistors to the line.



## Trip to Protection Island

Each spring and fall during bird migration season, the Port Townsend Marine Science Center and the Audubon Society offer weekend cruises to Protection Island. On Saturday, October 7, Jackie and I took advantage of the three-hour boat trip.

For Jackie, this was a bit of nostalgia. As a young girl growing up in Port Townsend, she and her chums would motor to Protection Island from Beckett's Point to see the gulls' nests and dig for bones of prehistoric animals. For me, this was an opportunity to see one of her old haunts, and to gain a bit of Beach Watchers "continuing education."

We boarded the *Olympas* at Point Hudson marina. Our guides were Judy from the Marine Science Center, Roger our naturalist, and Bob from the Audubon Society. All were extremely knowledgeable and helpful with their explanations of who and what we were seeing.

Of special interest to me were the geological changes of Protection Island. I had just spent a day with Hugh Shipman, so seeing the two (ever changing) spits, created and fed by the continually eroding bluffs, made much of what he had said real. Roger pointed out many of the geological features of the bluffs; that the north and west sides eroded from different causes; the various effects of wind and waves; the composition of the bluff; and the cormorant nests.

The *Olympas* could navigate in fairly shallow water, so we were able to get close enough to the island to see bottom--the "platform"--as Hugh Shipman described it. The platform extended out a long way, demonstrating just how much of the island has been lost to erosion. Every indication is that the entire island will disappear before long.

Near the island, we came across a large number of gulls and other birds busily dealing with a "bait ball." We could see some of the herring, but mostly we saw fish scales floating above where the "ball" had been. This was especially interesting, having seen a film clip of a "bait ball" at the Port Townsend Marine Science Center several months ago.

The water was extremely calm so our crew persuaded the captain to take us over to Smith Island (off West Beach on Whidbey Island). Like Protection Island, it is rapidly eroding. Extending out from Smith Island is a long spit that connects to what is referred to as Minor Island.



Photo by Graham Johnson

This area is home to a large variety of birds. Of special interest is the only land-based eagle's nest known to exist in this area, and also the leaning lighthouse, evidence of the ever-changing surface on which it was built.

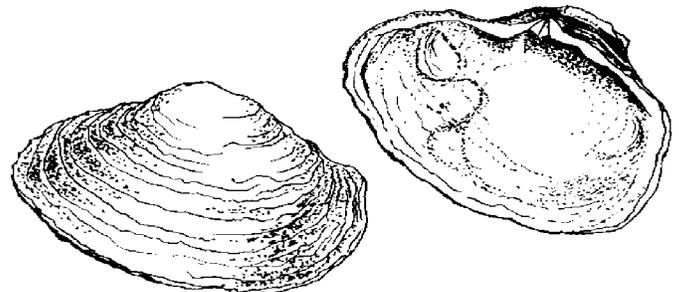
It was an enjoyable and worthwhile day, and I would welcome doing it again.

Graham Johnson, BW Class of 2006



Photo by Graham Johnson

Heerman gulls and a cormorant participating in a feeding frenzy





## Our Summer Vacation: Adventures in the Amazon Rain Forest and land of the Incas, Part 2

Sixteen Island County Beach Watchers and friends traveled to Peru in June. Beach Watchers received \$3251 because we organized the trip and traveled together. After a week exploring the Amazon, we flew from Iquitos back to Lima before flying to Cusco, the capital city of the Inca Empire. The people and natural environment west of the Andes Mountains couldn't be more different than those living in the Amazon basin. Spanish and Quechua (Incan language) are the official languages of Peru; Quechua is the native language of the Inca descendants.

The Andes mountains divide Peru into very different ecosystems. On the Amazon (east) side, the snow-topped mountains are covered with trees that lead down to many, many rivers draining into the Amazon basin. The density of the verdant tropical vegetation makes human habitation difficult, but the rivers provide most needs for the people who live there.

On the Pacific (west) side, the mountains are barren rock with glaciers and high lakes that lead to a coastal desert plain with little vegetation or natural rainfall. These west side areas are the most developed and have the largest cities. The desert plain is hot and dry January to March; humans rely on snow melt for drinking water and crop irrigation. Clay-colored brick houses and buildings typically have flat roofs, so clearly they don't worry about much rain or snow. A perpetual fog (La Garua) from the ocean cools the desert plain for much of the rest of the year.

Mountains somewhat like a ladder with high mountain valleys surround the Andes range. Cusco is located in one of these valleys at an elevation of nearly 11,000 feet. Small villages and fields dot the valleys, with terraces dug into the steep mountainsides. Human habitation in Peru dates back to 8000 B.C. The Incas were the last and best known of these ancient societies but only had a brief reign from the 1300s to the Spanish conquest in 1532. Cusco was the richest city in all the Americas when the Spanish arrived. Francisco Pizarro and his conquistadors, with the advantage of horses and cannons, looted its vast treasure of silver and gold, and killed the Inca leader Atahualpa. The Incas never reemerged to power. Pizarro set up a new capital in Lima and nearly destroyed all remnants of the Inca Empire. The Spanish ruled Peru for the next 200 years until a revolt in 1780, led by an Incan, Tupac Amaru. Forty years of unrest ended when Peru declared independence in 1821. The

country has vacillated between democracy and dictatorship ever since.

Today, about half of Peru's 27.5 million people are of native ancestry, many Inca; another third are mestizo (mixed native and European); one-tenth are European, and a small fraction are African or Asian minorities. The Spaniards brought Roman Catholicism to the people of Peru, baptizing the native people and renaming them using Spanish names. Today most Peruvians are Roman Catholic, and many Amerindians practice both Catholic and Inca rituals.

In Lima we met Freddy, our Inca guide who has lived in Cusco all his life. The next day we flew to Cusco, to prepare ourselves for the altitude adjustment, and were introduced to coca leaves that natives chew (they have a bitter taste) or make into tea (we opted for the tea). Cocaine is derived from the same plant, but coca leaves are not narcotic. The natives use coca leaves to alleviate the effects of high altitude, and we all became devotees of this tea.

In Cusco, we visited Iglesia de la Merced, a Jesuit Convent with a lovely courtyard and a collection of antique Roman Catholic vestments adorned with gold, silver, and precious stones, and paintings (including a Rubens). A large solid gold monstrance was encrusted with hundreds of rubies, emeralds, pearls, and sapphires. The world's largest freshwater pearl is set in a gold mermaid setting. El Templo del Coricancha (Temple of the Sun) was the most important place of worship in the Inca empire, with walls covered with sheets of gold studded with emeralds and turquoise. The Spanish stole the gold and jewels, plastered and painted the walls with European designs in an effort to obliterate the Inca culture, and converted it to Iglesia Santo Domingo, as it stands today. Magnificent architecture remains in evidence in this church and throughout Cusco; stones are honed to perfectly fit together with wide bases narrowing as they go up to the ceiling. This building and other Inca buildings survived several major earthquakes with little or no damage.

The next day, we began to explore the area around Cusco, visiting the Inca ruins of Quenko, an Incan shrine carved from granite rock outcroppings, and Sacsayhuaman (pronounced 'sexy woman'), a huge complex built on the hill overlooking the city. In the 1300s massive stones, some weighing as much as 128 tons each, were dragged from a site three miles away and were fitted together creating a military fortress housing as many as 5000 Incan soldiers at



*Photo by Linda Riddler*

Linda and Mac LaMay inspect walls at Sacsayhuaman

one time. It is thought that 150,000 workers labored for 100 years to erect Sacsayhuaman without mechanization of any kind and without using animals. The fortress was built in the shape of a puma (mother earth). Zigzag walls are thought to represent the sky or upper-world. The Spanish attempted to destroy all known Inca sites in order to prevent the practice of Incan rituals. They tore down many structures in Sacsayhuaman and covered both ruins with dirt.

We visited Domingo, an Inca shaman, who blessed us in an Incan ritual. We learned the differences between synthetic, llama, alpaca, baby alpaca, and vicuna (the most valuable wool in the world) yarn in a textiles shop. Baby alpaca is the wool from an alpaca's first shearing and is oh so soft. We watched artisans creating lovely silver jewelry and ornaments in a silversmith workshop. And of course, we shopped!

Our home-hosted lunch featured blue corn juice sweetened with cinnamon, lemon and sugar--very tasty; corn kernels toasted and salted as a pre-dinner snack; and the grain quinoa (pronounced keen-wa) made into a soup. The main course included a corn tamale, mashed beans with cumin and onion, and a medley of vegetables. The star of the meal was roasted guinea pig, brought to the table whole. Guinea pigs (tastes a bit like chicken) are never kept as pets here; they are a favorite delicacy for special occasions. For dessert, we had a yellow fruit (they called it a tomato, but it was not what we call a tomato)

poached in clove syrup. Mint coca tea ended the meal. We gave our hostess gifts and said our good-byes. As in Lima, ample time was provided for us to explore on our own. With an extensive market with individual Amerindians selling crafts just across the street from our hotel, we shopped—some of us often!

Early the next morning we boarded a bus for the drive through the Sacred Valley to Machu Picchu. We stopped in Chinchero (altitude 12,400 feet) to visit a family of weavers, all women. They warmed us with coca tea, wrapped us in woolen wraps, and demonstrated their craft. The wool was first washed with grated elderberry root and then spun twice before dyeing. They use only natural dyes to create a myriad of colors. The most interesting dye was cochineal, made from an insect that lives on a cactus. Ground to a reddish-purple powder and mixed into hot water, it creates a wide range of colors, from deep purple to red to orange, by increasing the acidity with lemon juice. We watched them wind the warp threads onto a metal frame for wide weavings. Narrower pieces are woven on a back-strap loom secured by a post (or her foot). The edges of most pieces had small oval disks woven into the binding, representing mountain lakes that are very important to these people in an arid climate. After the demonstration, of course, we SHOPPED!

In this culture, festivals provide opportunities for young people to meet one another. Inca women wear their hair in one braid if they are single, and two if they are married. Typically, young people live together two or three years before they marry. Incas become adults at 14, when they can marry and are given land to work. The community (everyone votes) determines which plot of land goes to which boy or girl. When someone dies, the land reverts to the community; if one's parent had a particularly good plot of land, the next generation will get a lesser plot. The community works together to build houses for new landholder. If a child is born to a couple that decides not to marry, the community decides which set of grandparents will raise the child.

Traveling through the Sacred Valley, the gorge of the Urubamba river, small villages, mud huts, houses, and small farms dot the landscape with dramatic mountains as a backdrop. Inca ruins are abundant. Ollantaytambo is at the northern end of the Sacred Valley and is the literal end of the road for vehicles. The choice is to board a train, which we did, or to hike the Inca Trail to Machu Picchu. The train terminus is Aguas Calientes, a small town at the



base of Machu Picchu that grew to serve the thousands of tourists who visit, and where we spent the night.

The ancient Inca Trail connected Cusco to Machu Picchu for a distance of 70 miles. Relay runners delivered important communications in about seven hours. When the Spaniards began their systematic destruction of the culture, the Incas destroyed the trail from Cusco, the Spanish never discovered Machu Picchu, and it was left intact. A farmer caused a large fire in 1902 and allegedly rediscovered Machu Picchu. It is thought he sold artifacts in Cusco, giving rise to rumors. Yale anthropologist Hiram Bingham sought out and paid the farmer to show him the site in 1911, leading to Bingham's discovery of Machu Picchu. Actually, a government road had been constructed in the late 1800s to the site, and three families lived there prior to Bingham's arrival. Our guide said the site was never lost to the local Incas. For several years, Bingham returned to the site but was denied access after he was accused of removing artifacts. He denied the accusation; interestingly, the Yale museum held an exhibit of Inca artifacts from their collection in 2001.

Today, the Inca Trail can be hiked in three to five days, starting at the 85th kilometer with a rise in elevation from 8000 to 14,000 feet. The mountains on which Machu Picchu is built rise steeply from the valley floor; our bus ride up to the entrance took 20 minutes. As we toured the city with our guides, we learned the importance and function of the various structures; their engineering prowess is stunning to see. To agricultural terraces supported by stonewalls, fertile valley soil was carried up the mountain, basket by basket. Buildings are of tightly fitted stones, many without mortar. Water was delivered throughout the city by channels carved into the stones.

Pachacutec began construction on Machu Picchu, in the shape of a condor, in the late 1430s. It was intended as a summer spiritual refuge, with the condor representing the upper world, the puma the middle world, and the snake, the underworld in Incan culture. While Pachacutec knew he would not live to see Machu Picchu's completion, the entire complex was built, occupied, and deserted in less than 100 years. High in the mountains, it was an ideal astronomical observatory; numerous structures determine exact solstices to help know when to plant and harvest crops. The Temple of the Sun is particularly noteworthy, as the rising sun aligns perfectly at the summer solstice with a cut in a granite outcrop, and the surrounding building captures shadows at precise angles. Shallow pools carved in stones were used to reflect and study the positions of the stars.

Machu Picchu was never intended to be a year-round community; the 700 residents were never self-sustaining there. It was built for religious purposes to be close to the Sun. It is thought 50,000 workers developed Machu Picchu, using seven trails to haul huge rocks, building materials and fertile valley soil to the site. Hematite wedges were used to fracture natural cracks in granite to yield usable pieces. The wooden floors between levels and roofs of mud and thatch have all rotted away. Burial tombs have recently been found, perhaps another reason for the Incas to keep Machu Picchu a secret from the Spaniards. After killing Atahualpa the Spanish planned to burn his body, contrary to Inca custom. Three days after his death, Atahualpa's body disappeared, and some Incas believe he was mummified and buried, possibly at Machu Picchu. Thus far, excavations of the royal burial tombs have not found Atahualpa's body.

Inca homes are a single room, then and now, with people spending their waking hours outside in the fields. Incas today don't understand why we have separate rooms and think we must not like each other! Houses were used only for rest and cooking the two daily meals, at breakfast and in the late afternoon. All garbage was burned and the ash spread over toilet areas. Houses had one door and no windows; storage areas on an upper level might have a window at each end. The king's house was a single room, 12 by 20 feet, with a narrow stone passage so invaders had to enter single file. Priests and royal class families lived in houses with stones fitted together tightly without mortar, while commoners' stone homes had mortar. Social class also determined the kind of cloth one could wear. Only the



The crew at the top of Huayna Picchu overlooking Machu Picchu



king could wear vicuna, as they had to kill the vicuna to get the wool (it is claimed they no longer do this. . .). The royal class could use alpaca, and pima cotton grown near the coast. Commoners were restricted to llama and sheep wool. Llamas were brought to the site to keep the grass down, and their descendants now roam the site freely.

We visited the city twice during times when most tourists weren't there, in late afternoon and early morning. It was wonderful to view the nearly deserted Machu Picchu in the peaceful setting sun and again the next morning. On our second trip to the city, one group hiked the gradual ascent to the Sun Gate (Intipunku), the primary route the Incas used to enter the city. Five of us opted for the challenging climb to the top of Huayna Picchu (Waynapichu), a steep, towering granite peak overlooking Machu Picchu from the north. Both hikes took us to about 9000 feet, with magnificent views of the city, the glacier-capped mountains and the valleys below. According to our guide, the glaciers have retreated about 30% in the 20+ years he has been coming to the site. They are quite worried about global warming, as residents of the coastal desert plain and the western mountain valleys are dependent on the glaciers for water. Some think previous ancient cultures may have disappeared due to periods of severe drought.

We rode the train to Ollantaytambo, where we visited a magnificent potter who demonstrated of his art. After mixing sand, clay and water, his thrown pieces are air dried six to eight hours before being polished with an agate. Designs are carved into the surface and mineral dyes are applied, followed by more air drying. After being wood-fired at 900°C for 12 to 14 hours, porcelain is painted on the inside and the piece is fired again in an electric oven at 1200°C. The result is a very hard surface, which he demonstrated by banging a piece on a stone table and pounding a nail with it. Of course, we shopped!

Our farewell dinner in Cusco was in the former palace of Pachacutec with the strong Inca walls still evident. We dined on alpaca (delicious) while dancers and musicians performed for us. We also visited Lima's private gold museum with its collection of pre-Inca gold artifacts, mummies, weapons from the Spanish Conquistadors and pottery dating to 800 B.C.

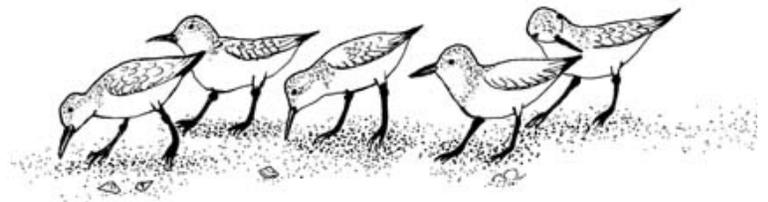
We rested and packed (or shopped) before our overnight flight home. We all learned so much and had fun doing it with a great group of Island County folks, and we were happy to help support Beach Watchers at the same time. Thanks to all who joined us: Shirley Caraway and Bill

Griffith, Ann and Ray Curtis, Sandy Dubpernell, Sharon Dunn, John and Emi Hastings and Robin Obata, Stephanie Hunter, Mac and Linda LaMay, Tom and Vicki Perry and Gregg and Linda Ridder.

The next Beach Watchers adventure is to New Zealand in January 2007! There may still be a couple of spaces left in our group.

Where in the world do you want to go? Contact Linda Ridder with suggestions or questions at *ADE-RIDL@whidbey.com* or 360-579-2521.

*Linda Ridder, BW Class of 2005*



## Whidbey Watershed Stewards

The creek restoration project on private property near the Maxwellton Outdoor Classroom continues, with volunteer days on Oct. 21, 28, Nov. 4 and 11, 9:30 a.m. to 2:00 p.m. The new, large culvert is in, and volunteers of all ages have been planting native shrubs and trees, and placing cardboard and mulch. This will shade the creek and attract and provide habitat for wildlife for salmon recovery.

Meet at the Outdoor Classroom by 9:30 a.m. to car-pool to the site (if you have time restraints, we can get you back to your car early). All equipment is provided -- wear sturdy shoes or boots and bring gloves if you want, and rain gear if needed. Snacks are provided; bring lunch if you want something more substantial. Call 360-579-1272 or e-mail *info@whidbeywatersheds.org* to sign up.

Also, Whidbey Watershed Stewards is offering a free, non-point pollution class called "Healthy Backyards" at South Whidbey Parks and Recreation on Thurs, Nov. 2, 7:00 to 8:30 p.m. at the Intermediate School Community Room. How can you help keep the water and land of Puget Sound and the islands safe for wildlife and people? In this class you'll learn techniques to apply at home, work, school and play. The leaders are Whidbey Watershed Stewards and guest speakers. Support materials will be provided.

*Nancy Waddell, Director, Whidbey Watershed Stewards*



Washington Lighthouse License Plates



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Town of Coupeville



*"In the end we will conserve only what we love; We will love only what we understand;*

*We will understand only what we have been taught."*

*~ Baba Dioum, Senegalese ecologist*

**DEADLINE FOR NEXT BEACH LOG  
November 3, 2006**